STATUS OF THE CLAIMS

1. (Currently Amended) An assay system comprising:

first and second reflective surfaces that are structured and arranged to provide a channel therebetween, to accommodate a fluid having material to be tested, at least one of the first and second reflective surfaces having capturing material disposed in ~~a pattern of an array~~an array pattern, the array pattern having~~ to generate~~ a plurality of resonant cavity regions between said first and said second reflective surfaces;

a source of radiation to illuminate each cavity region at a wavelength adapted to provide a standing wave of radiation within each said cavity region;

a radiation detector that is structured and arranged to detect a change in a standing wave pattern, which is indicative of binding of the capturing material with the material to be tested in the fluid within each said cavity region; and

means for dynamically varying spacing of said first and second surfaces.

2. (Currently Amended) An assay system comprising:

first and second reflective surfaces that are structured and arranged to provide a channel therebetween, to accommodate a fluid having material to be tested;

a plurality of regions in a pattern of an array between said first and second surfaces, each region defining a cavity and adapted to receive a capturing material on one of the first and second surfaces therein;

a source of wavelength scanned radiation to illuminate each region at a wavelength adapted to provide a transmission of that radiation within each said cavity representative of material from said fluid bound to said capturing material; ~~and~~

a detector for the radiation in each said cavity and operative to indicate the level of binding by said capturing material of material in said fluid within each said cavity; and

means for dynamically varying spacing of said first and second surfaces.

3. (Previously Presented) The assay system of claim 1 wherein said first and second reflective surfaces include one or more dielectric layers forming said corresponding reflective surface at a wavelength corresponding to said standing wave pattern.

4. (Canceled).

5. (Previously Presented) The assay system of claim 1 wherein said capturing material as applied to each cavity forms a DNA or protein chip where individual capturing materials in each cavity are DNA or protein selective.

6. (Previously Presented) The assay system of claim 1 wherein said radiation source is an IR source.

7. (Previously Presented) The assay system of claim 1 wherein said radiation source is a laser source.

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8. (Previously Presented) The assay system of claim 1 wherein said radiation source is a tunable laser source.

9. (Currently Amended) The assay system of claim 7 further including means for scanning ~~sweeping the wavelength of~~ said tunable laser through~~over~~ a range of wavelengths including a wavelength corresponding to said standing wave pattern in each cavity.

10. (Previously Presented) The assay system of claim 1 further including a beam expander in a path of radiation between said radiation source and said channel.

11. (Previously Presented) The assay system of claim 1 further including a beam condenser in a path of radiation between said channel and said detector.

12. (Previously Presented) The assay system of claim 1 wherein said detector includes a multi element detector wherein each element receives radiation from a corresponding cavity.

13. (Previously Presented) The assay system of claim 1 wherein said detector is a CCD detector.

14. (Previously Presented) The assay system of claim 1 wherein said first and said second reflective surfaces are parallel and radiation from said source is applied othogonally to said first and second reflective surfaces.

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15. (Previously Presented) The assay system of claim 1 wherein said radiation is applied obliquely to at least one of said first and second surfaces.

16. (Previously Presented) The assay system of claim 1 wherein said detector detects one or more of radiation amplitude, phase, polarization and wavelength.

17. (Previously Presented) The assay system of claim 1 wherein said source of radiation includes means for causing said radiation to emit at discrete different wavelengths.

18. (Previously Presented) The assay system of claim 1 further including means for controlling a temperature of the fluid within said channel.

19. (Canceled).

20. (Previously Presented) The assay system of claim 1 wherein said detection system includes a photodetector array integral with a support for one of said reflective surfaces which is not supporting a capturing material.

21. (Previously Presented) The assay system of claim 1 wherein said at least one reflective surface having said capturing material thereon has an added dielectric layer to provide a peak in a standing wave pattern in said cavity at said capturing material.

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22. (Previously Presented) The assay system of claim 1 further including means for varying the spacing of said reflective surfaces to vary the cavity resonance condition.

23. (Currently Amended) A method for assaying a material under test, the method comprising:

providing a channel bounded by first and second reflective surfaces adapted to accommodate ~~a fluid~~ at least one of the material under test and a fluid containing the material under test therebetween;

providing a plurality of regions to one of said first and said second reflective surfaces in ~~a pattern of~~ an array of capturing material elements to form a corresponding plurality of resonant cavities~~between said first and said second reflective surfaces~~;

applying ~~, each region defining a resonant cavity and adapted to receive~~ a capturing material to the capturing material elements in~~on~~ the array on one of the first and second surfaces~~ therein~~;

dynamically varying a spacing between said first and said second reflective surfaces, to maintain said reflective surfaces in parallel throughout the method;

passing the material under test or flowing the fluid containing the material through the channel;

applying radiation as the fluid flows past or the material under test passes each region to illuminate each region at a wavelength adapted to provide a standing wave of radiation within each said resonant cavity; and

measuring~~detecting~~ the radiation in each said resonant cavity; and

detecting ~~operative to indicate~~ a change in resonant properties of the standing wave pattern due to ~~reflective~~ an affinity of the material under test to bind ~~of binding~~ to the ~~of~~ capturing material at ~~with material in a fluid within~~ each said resonant cavity.

24. (Currently Amended) A method for assaying a material under test, the method comprising:

providing a channel bounded by first and second reflective surfaces adapted to accommodate at least one of the ~~therebetween a fluid having~~ material under test and a fluid containing the material under test therebetween~~to be tested~~;

providing a plurality of regions to one of the first and second reflective surfaces in ~~a pattern of~~ an array of capturing material elements between said first and said second reflective surfaces;

applying ~~, each region defining a cavity and adapted to receive~~ a capturing material to the capturing material elements ~~on one of the first and second surfaces therein~~;

dynamically varying a spacing between said first and said second reflective surfaces, to maintain said reflective surfaces in parallel throughout the method;

passing the material under test or flowing the fluid containing the material through the channel;

applying a scanning source of radiation as the fluid flows past or the material under test passes each region to illuminate each region at a wavelength adapted to provide a transmission of that radiation within each said cavity representative of material from said fluid bound to said capturing material; ~~and~~

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measuring ~~detecting~~ the radiation in each said resonant cavity; and

detecting a change in resonant properties of the transmission due to an affinity of the material under test to bind to the ~~operative to indicate the level of binding by said~~ capturing material at ~~of material in said fluid within~~ each said cavity.

25. (Previously Presented) The assay method of claim 23 wherein said first and second reflective surfaces include one or more dielectric layers forming said reflective surface at a wavelength corresponding to said standing wave pattern.

26. (Canceled).

27. (Currently Amended) The assay method of claim 25 further comprising:

applying~~wherein~~ said capturing material ~~as applied~~ to each cavity in ~~is provided as~~ a DNA chip or protein chip format such that ~~where~~ individual capturing materials in each resonant cavity are DNA or protein selective.

28. (Previously Presented) The assay method of claim 25 wherein said radiation is IR.

29. (Previously Presented) The assay method of claim 25 wherein said radiation is laser radiation.

30. (Previously Presented) The assay method of claim 25 including the step of tuning said radiation.

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31. (Currently Amended) The assay method of claim 30 further including the step of scanning ~~sweeping the wavelength of~~ said radiation through ~~over~~ a range of wavelengths including a wavelength corresponding to said standing wave pattern in each cavity.

32. (Previously Presented) The assay method of claim 25 further including the step of expanding said radiation in a beam along a path of radiation between said radiation source and said channel.

33. (Previously Presented) The assay method of claim 25 further including the step of condensing a beam of radiation along a path of radiation between said channel and said detector.

34. (Previously Presented) The assay method of claim 25 wherein said detecting step includes detecting in each of a plurality of detection elements wherein each element receives radiation from a corresponding cavity.

35. (Previously Presented) The assay method of claim 25 wherein said first and second surfaces are parallel and radiation from said source is applied othogonally to said first and second surfaces.

36. (Previously Presented) The assay method of claim 25 wherein said radiation is applied obliquely to at least one of said first and second surfaces.

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37. (Previously Presented) The assay method of claim 25 wherein said detection step detects one or more of radiation amplitude, phase, polarization and wavelength.

38. (Previously Presented) The assay method of claim 25 wherein said radiation is emitted at discrete, different wavelengths.

39. (Previously Presented) The assay method of claim 25 further including the step of controlling a temperature of the fluid within said channel.

40. (Canceled).

41. (Previously Presented) The assaying method of claim 25 wherein said detecting step includes detecting at a photodetector array integral with a support for one of said reflective surfaces which is not supporting a capturing material.

42. (Previously Presented) The assaying method of claim 25 wherein said reflective surface is provided having said capturing material thereon has an added dielectric layer to provide a peak in a standing wave pattern in said cavity at said capturing material.

43. (Previously Presented) The assay system of claim 25 further including varying the spacing of said reflective surfaces to vary the cavity resonance conditions.

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44. (Currently Amended) An assay system comprising:

first and second reflective surfaces that are structured and arranged to define a space~~zone~~ therebetween, the space ~~zone~~ being adapted to accommodate therebetween a material to be tested;

a plurality of regions in a pattern of an array between said first and said second reflective surfaces, each region defining a resonant cavity between the first and second reflective surfaces therein;

a source of radiation to illuminate each region at a wavelength adapted to provide a standing wave of radiation within each said resonant cavity;

a detector for the radiation in each said resonant cavity and operative to indicate a change in the standing wave pattern reflective material within each said resonant cavity; and

means for dynamically varying spacing of said first and second reflective surfaces.

45. (Currently Amended) An assay system comprising:

first and second reflective surfaces that are structured and arranged to define a channel therebetween, the channel being adapted to accommodate a material to be tested;

a plurality of regions in a pattern of an array between said first and said second reflective surfaces, each region defining a cavity between the first and second reflective surfaces therein;

a source of wavelength scanned radiation to illuminate each region at a wavelength adapted to provide a transmission of that radiation within each said resonant cavity representative of said material;

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a detector for the radiation in each said resonant cavity and operative to indicate the level material within each said resonant cavity<u>; and</u>

<u>means for dynamically varying spacing of said first and second reflective surfaces</u>.

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